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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/063,473	04/26/2002	Eddy Benjamin Boskamp	121066	1173

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EXAMINER

VARGAS, DIXOMARA

ART UNIT PAPER NUMBER

2859

DATE MAILED: 02/25/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/063,473	Applicant(s) BOSKAMP, EDDY BENJAMIN	
	Examiner Dixomara Vargas	Art Unit 2859	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 January 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-31 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-5, 7-11, 13-17, 19-23 and 25-26 and 28-30 are rejected under 35 U.S.C. 102(b) as being anticipated by Leussler (US 6,043,658 A).

With respect to claims 1, 7, 19 and 25, Leussler discloses an apparatus for magnetic resonance imaging, comprising (Figure 1): a degenerate birdcage coil (Figure 2, #8) having a pair of opposing rings and a plurality of rungs positioned circumferentially around said pair of rings (Figure 2); input excitation circuitry for applying excitation radio frequency (RF) energy to said degenerate birdcage coil at a first resonance mode thereof (Figure 1, #4); and output receiving circuitry for receiving RF energy emitted by an object positioned within said degenerate birdcage coil (Figure 1, #10), said output receiving circuitry receiving said emitted RF energy at a plurality of resonance modes at a single frequency of said degenerate birdcage coil, including said first resonance mode (Column 4, lines 61-67).

3. With respect to claims 2, 8, 14, 20 and 26, Leussler discloses said input excitation circuitry includes one or more phase shifting splitters for sinusoidally applying said excitation

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RF energy to one or more of said plurality of rungs (Columns 5, lines 30-48; Abstract; Figures 4-5).

4. With respect to claims 3, 9, 15, 21 and 28, Leussler discloses said output receiving circuitry includes one or more combiners for combining said emitted RF energy from one or more of said plurality of rungs (Columns 5, lines 30-48; Abstract; Figures 4-5).

5. With respect to claims 4, 10, 16, 22 and 29, Leussler discloses said one or more combiners include phase shifting combiners (Columns 5, lines 30-48; Abstract; Figures 4-5).

6. With respect to claims 5, 11, 17, 23 and 30, Leussler discloses said degenerate birdcage coil is configured as a phased array by combining said emitted RF energy at each of said plurality of resonance modes (Columns 5, lines 30-48; Abstract; Figures 4-5).

7. With respect to claim 13, Leussler discloses the claimed limitations as stated above in paragraph 4 and additionally discloses a computer (Figure 1, #10) a magnet assembly for generating a polarizing magnetic field (Figure 1, #10); a gradient coil assembly for applying gradient waveforms to said polarizing magnetic field along selected gradient axes (Figure 1, #5-#7) and a radio frequency (RF) transceiver system for applying RF energy to excite nuclear spins of an object to be imaged (Figure 1, #3), and for thereafter detecting signals generated by excited nuclei of said object to be imaged (Figures 1 and 2; #8).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 6, 12, 18, 24 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Leussler (US 6,043,658 A) in view of Harvey (US 6,522,140).

With respect to claims 6, 12, 18, 24 and 31, Leussler discloses the claimed invention as stated in paragraph 4 above except for each of said plurality of resonance modes is used for sensitivity encoding (SENSE). However, Harvey discloses the use of the SENSE method for each of said plurality of resonance modes (Abstract). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use Harvey known SENSE method in Leussler's NMR resonator in the NMR system for the purpose of enabling the image acquisition to be performed with a reduced FOV (field of view); parallel, multi-channel detection in short as possible acquisition time.

10. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Leussler (US 6,043,658 A) in view of Mehdizadeh et al. (US 5,144,240 A).

With respect to claim 27, Leussler discloses the claimed invention as stated in paragraph 4 above except for the step of configuring a 180 ° phase shifting splitter and a pair of 90 ° phase shifting splitters for sinusoidally applying said excitation RF energy to one or more of said rungs of the degenerate birdcage resonator. However, Mehdizadeh discloses the claimed invention as stated in paragraph 4 above except for the step of configuring a 180 ° phase shifting splitter (Column 6, lines 6-9) and a pair of 90 ° phase shifting splitters for sinusoidally applying said excitation RF energy to one or more of said rungs of the degenerate birdcage resonator (Columns

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3 and 4, lines 66-68 and 1-2 respectively). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have a 180° phase shifting splitter and a pair of 90° phase shifting splitters as taught by Mehdizadeh with Leussler's NMR resonator in the NMR system for the purpose of isolating the different possible modes of operation of the degenerate birdcage resonator.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The additional prior art cited in the PTO 892 discloses NMR coils or probe systems with multiple modes of operation with a single frequency.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dixomara Vargas whose telephone number is (571) 272-2252. The examiner can normally be reached on 8:00 am. to 4:30 pm..


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diego Gutierrez can be reached on (571) 272-2245. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Dixomara Vargas
Art Unit 2859
February 5, 2004



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